

THE FAMILY CRUCIFERAE IN THE GREAT BLACK SWAMP REGION OF OHIO*

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The phytogeographic region of Ohio known as the Great Black Swamp comprises that area drained by the Maumee River. As outlined by Schaffner (1932), the counties involved include Lucas, Wood, Henry, Sandusky, Hancock, Putnam, Van Wert, Paulding, Defiance, Williams, and Fulton. Following the advances of modern agriculture, this region has been widely cultivated and natural habitats are confined to stream banks, state forest or park areas and a few relatively undisturbed wooded lots. Other farm woodlands have been grazed. Disturbed habitats such as roadsides, railroad banks, moist pastures, cultivated fields and drainage ditch banks provide suitable habitats for members of the mustard family.

The family Cruciferae represents one of the larger segments of the flora of the Great Black Swamp. The four-parted, tetradynamous flowers are readily identified. However, identification of the genera and species proves more difficult. It is essential that the plants are collected in mature fruit, preferably with flowers present at the apex of the inflorescence.

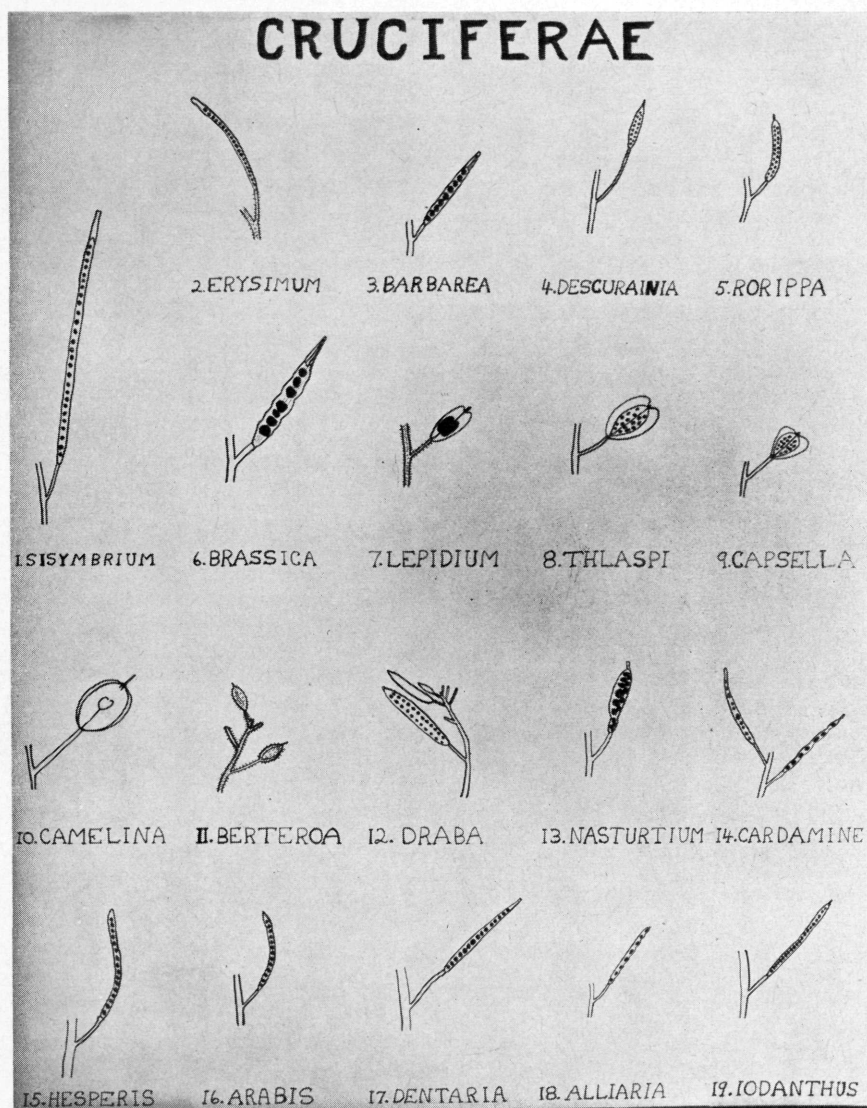
While most of our mustards occupy weedy habitats, genera such as *Dentaria* and *Cardamine* are found in moist rich woods as part of our spring flora. Other genera such as *Hesperis* and *Nasturtium* have been cultivated and established themselves in the wild. Many of the mustards have been introduced from Europe and have established themselves as weeds along roadsides and in waste places.

E. L. Moseley (1928) lists 14 species from the Oak Openings area. J. H. Schaffner (1932) reports 39 species from the counties of northwest Ohio. The present paper provides a guide for 33 species dispersed among 19 genera. Nomenclature follows that of H. A. Gleason (1952).

KEY TO GENERA

- A. Fruit not more than 5 times as long as wide, a silicle.
 - B. Fruit flattened.
 - C. Locule one seeded. 7. *Lepidium*
 - CC. Locule more than one seeded.
 - D. Fruit obcordate, triangular, narrowly winged at summit. . 9. *Capsella*
 - DD. Fruit orbicular or broadly elliptic with conspicuous wing encircling fruit. 8. *Thlaspi*
 - BB. Fruit not flattened.
 - E. Fruit elongated, at least twice as long as wide.
 - F. Pubescence of both simple and branched hairs, leaves mostly basal. 12. *Draba*
 - FF. Pubescence of simple hairs, or none, stems leafy. 5. *Rorippa*
 - EE. Fruit obovoid or elliptic
 - G. Flowers yellow, petals not cleft, seeds not winged. 10. *Camelina*
 - GG. Flowers white, petals deeply cleft, seeds winged. 11. *Berteroa*
- AA. Fruit more than 5 times as long as wide, a silique.
 - H. Flowers yellow.
 - I. Fruit divided transversely into a lower, dehiscent, seed-bearing unit and an upper, indehiscent beak, 8-15 mm long. 6. *Brassica*

*Research supported by a grant from The Ohio Academy of Science.



EXPLANATION OF FIGURES IN PLATE

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| 1. <i>Sisymbrium altissimum</i> L. | 10. <i>Camelina microcarpa</i> Andr. |
| 2. <i>Erysimum repandum</i> L. | 11. <i>Berteroa incana</i> (L.) DC. |
| 3. <i>Barbarea vulgaris</i> R. Br. | 12. <i>Draba reptans</i> (Lam.) Fern. |
| 4. <i>Descurainia pinnata</i> (Walt.) Britt.
var. <i>brachycarpa</i> (Richards) Fern. | 13. <i>Nasturtium officinale</i> R. Br. |
| 5. <i>Rorippa sylvestris</i> (L.) Besser. | 14. <i>Cardamine bulbosa</i> (Schreb.) BSP |
| 6. <i>Brassica kaber</i> (DC.) L. Wheeler | 15. <i>Hesperis matronalis</i> L. |
| 7. <i>Lepidium campestre</i> (L.) R. Br. | 16. <i>Arabis lyrata</i> L. |
| 8. <i>Thlaspi arvense</i> L. | 17. <i>Dentaria laciniata</i> Muhl. |
| 9. <i>Capsella bursa-pastoris</i> (L.) Medic. | 18. <i>Alliaria officinalis</i> Andr. |
| | 19. <i>Iodanthus pinnatifidus</i> (Michx.) Steud. |

- II. Fruit not so divided.
- J. Seeds in two rows in each valve of the fruit.
- K. Stems glabrous or pubescent with simple hairs, raceme not glandular. 5. *Rorippa*
- KK. Stem pubescent with simple and branched hairs, raceme with short stipitate glands. 4. *Descraineria*
- JJ. Seeds in one row in each valve of the fruit.
- L. Stems pubescent with branched or stellate hairs. 2. *Erysimum*
- LL. Stems pubescent with simple hairs or glabrous.
- M. Cauline leaves clasping stem, basal leaves pinnatifid with large terminal lobe. 3. *Barbarea*
- MM. Cauline leaves not clasping stem, basal leaves pinnatifid but with no large terminal lobe. 1. *Sisymbrium*
- HH. Flowers white, pink or purple.
- N. Leaves palmately divided or palmately compound. 17. *Dentaria*
- NN. Leaves not palmately divided or palmately compound.
- O. Cauline leaves simple.
- P. Cauline leaves deltoid, 3-6 cm long and wide, coarsely toothed. 18. *Alliaria*
- PP. Cauline leaves not as above.
- Q. Valves of fruit nerveless and roll spirally at dehiscence. 14. *Cardamine*
- QQ. Valves nerved, do not roll spirally at dehiscence.
- R. Petals with a claw, flowers pale violet or purple, valve of fruit with inconspicuous midnerve.
- S. Stems with both simple and branched hairs. 15. *Hesperis*
- SS. Stems with simple hairs or glabrous. 19. *Iodanthus*
- RR. Petals without a claw, flowers usually white, valve of fruit with conspicuous midnerve. 16. *Arabis*
- OO. Cauline leaves compound.
- T. Petals bearing a claw, seeds wingless. 13. *Nasturtium*
- TT. Petals not bearing a claw, seeds narrowly winged. 14. *Cardamine*

1. *Sisymbrium* L.

Annual plants, 3-10 dm tall. Stem glabrous or pilose with simple hairs. Leaves deeply pinnatifid, segments linear, lanceolate or ovate. Flowers yellow. Fruit elongate, tipped by minute, persistent style with prominent midnerve and two lateral nerves on each valve.

Plants introduced from Europe and inhabit fields, roadsides and waste places.

- A. Fruits awl-shaped, appressed, 10-15 mm long; leaf segments usually ovate.
S. officinale (L.) Scop. Hedge Mustard
- AA. Fruits linear, widely divergent, 5-10 cm long; leaf segments linear to lanceolate.
S. altissimum L. Tumbling Mustard

2. *Erysimum* L.

Annual or perennial plants, 2-10 dm tall. Stem pubescent with branched hairs. Cauline leaves entire or minutely toothed, basal leaves similar or pinnatifid. Flowers yellow. Fruit elongate, pubescent, with prominent nerve on each valve.

Plants adventive along railroads or in waste places, introduced from Europe and Eurasia.

- A. Fruits ascending, 15-20 mm long; basal and cauline leaves similar, linear or lanceolate, entire or remotely sinuate. *E. cheiranthoides* L. Wormseed Mustard
- AA. Fruits divergent, 5-12 cm long; basal leaves pinnatifid, cauline leaves remotely sinuate-dentate. *E. repandum* L. Treacle Mustard

3. *Barbarea* R. Br.

Biennial plants, 2-8 dm tall. Stem glabrous or with few simple hairs. Basal leaves deeply pinnatifid with conspicuous terminal lobe, cauline leaves clasping and fewer lobed or merely toothed. Flowers yellow. Fruit elongate, minutely tipped, with prominent nerve and lateral veins on each valve.

Plants introduced from Europe and inhabit moist fields and ditches, often abundant in grain fields. Young basal leaves can be used for "greens."

B. vulgaris R. Br. Winter Cress.

4. *Descurainia* Webb. & Berth.

Annual or biennial plants, 2-7 dm tall. Stem glabrous or sparsely pubescent with branched hairs. Raceme with short glandular hairs. Basal leaves bipinnately compound or with deep pinnatifid segments, cauline leaves less divided. Flowers yellow or pale yellow. Fruits elongate, club-shaped, 8-10 mm long, 1-2 mm wide, with prominent nerve on each valve.

A native species inhabiting prairies, sandy areas and open woodland. Basal rosette of leaves usually absent at flowering time. The bipinnately compound leaves and glandular inflorescence are outstanding characteristics of this species. *D. pinnata* (Walt.) Britt. var. *brachycarpa* (Richards.) Fern.

Tansy Mustard.

5. *Rorippa* Scop.

Annual, biennial or perennial plants, 2-10 dm tall. Stem glabrous or pubescent with simple hairs. Leaves pinnatifid, basal leaves more deeply segmented. Flowers yellow. Fruit elongate or ovoid, with obscure midnerve on each valve.

Plants inhabiting wet soil, shores of rivers or streams and wet meadows.

A. Plant perennial from a rhizome, fruits commonly cylindric.....

R. sylvestris (L.) Besser. Marsh Cress

AA. Plant annual or biennial from stout roots, fruits commonly ovoid.....

R. islandica (Oeder.) Borbas var. *fernaldiana* Butters & Abbe. Yellow Cress

6. *Brassica* L.

Annual or biennial plants, 2-15 dm tall. Stem glabrous or sparsely hirsute. Basal leaves variously lobed, cauline leaves lobed, coarsely toothed or entire. Flowers yellow. Fruit elongate, with prominent beak; valves with prominent nerve or nerves.

Plants inhabit waste places, roadsides and fields, introduced from Europe.

A. Three conspicuous parallel nerves on each valve of the fruit.....

B. kaber (DC.) L. Wheeler. Charlock.

AA. One conspicuous midnerve on valve of fruit, other nerves inconspicuous.

B. Upper cauline leaves sessile and clasping.....

B. campestris L. (*B. rapa* L.) Field Mustard

BB. Upper cauline leaves not clasping, usually petiolate.....

B. nigra (L.) Koch. Black Mustard

7. *Lepidium* L.

Annual, biennial or perennial plants, 2-5 dm tall. Stem minutely to densely pubescent with short, simple hairs. Basal leaves sparsely lobed to pinnatifid, cauline leaves entire to dentate. Flowers white. Fruit short, flattened at right angles to the septum, orbicular to ovate in outline.

Plants inhabit waste places, roadsides and fields. The first species has been introduced from Europe. All these species have become common weeds.

A. Cauline leaves sessile and clasping, stem densely pubescent with short, simple hairs

L. campestre (L.) R. Br. Field Cress

AA. Cauline leaves sessile but not clasping; stem minutely pubescent.

B. Petals same length or longer than sepals.....*L. virginicum* L. Pepper Grass

BB. Petals shorter than sepals or absent.....*L. densiflorum* Schrader. Pepper Grass

8. *Thlaspi* L.

Annual plants, 1-5 dm tall. Stem glabrous. Basal and cauline leaves similar, the latter clasping stem. Flowers white in our species. Fruit orbicular, flattened, and deeply notched at the apex, conspicuously winged.

Plants introduced from Europe and inhabit roadsides and waste places. Similar to *Lepidium*, but can be separated easily by the number of seeds in each locule. *T. arvense* L. Penny Cress.

9. *Capsella* Medic.

Annual or biennial plants, 1-6 dm tall. Stem pubescent with stellate hairs. Basal leaves pinnately lobed, forming rosette. Cauline leaves entire or denticulate, sessile and clasping stem. Flower white. Fruit flat, triangular, notched at the apex.

Plants have become cosmopolitan, inhabiting waste places, roadsides and lawns; introduced from Europe.

C. bursa-pastoris (L.) Medic. Shepherd's Purse.

10. *Camelina* Crantz.

Annual plants, 3-7 dm tall. Stems glabrous, sparsely pubescent or more densely pubescent with both simple and branched hairs. Basal leaves short, petiolate. Cauline leaves sessile and clasping. Flowers yellow. Fruit obovoid, 7-10 mm long, 5-7 mm wide, with persistent style at apex.

Plants inhabiting waste places, railroad banks and fields, introduced from Europe. Similar to *Berteroa*, but can be separated by the pubescence or flower color.

A. Stem glabrous or pubescent with closely appressed branched hairs, fruit 6-10 mm long

C. sativa (L.) Crantz. False Flax

AA. Stem pubescent with both simple and branched hairs, fruit 4-6 mm long.

C. microcarpa (L.) Crantz. False Flax

11. *Berteroa* DC.

Annual plants, 2-7 dm tall. Stems canescent, with short, stellate hairs. Leaves entire, oblanceolate, sessile, not clasping. Flowers white. Fruits elliptic, 5-8 mm long, 3-4 mm wide, with persistent style at apex.

Plants introduced from Europe, inhabit waste places and fields.

B. incana (L.) DC. Hoary Alyssum.

12. *Draba* L.

Annual plants, 5-15 cm tall. Stem sparsely pubescent with simple hairs. Leaves mostly basal, obovate, pubescent with simple hairs on upper surface, stellate hairs beneath. Flowers white in our species. Fruit elongate, 1-2 cm long.

Plants of sandy soil. Moseley (1928) reports that these plants are more common where thin soil overlies limestone.

D. reptans (Lam.) Fern. Whitlow Grass.

13. *Nasturtium* R. Br.

Aquatic herbs. Stems glabrous and prostrate, many nodes producing roots. Leaves pinnately compound with orbicular segments, terminal segments usually larger. Flowers white. Fruit elongate, slender, 10-25 mm long.

Plants escaped cultivation and now inhabiting slow streams and wet ditches. Originally cultivated for salad, introduced from Europe.

N. officinale R. Br. Water Cress.

14. *Cardamine* L.

Annuals, biennials or perennial plants, 2-6 dm tall. Stems glabrous or sparsely pubescent with simple hairs. Leaves simple or compound. Flowers white or pinkish purple. Fruit elongate, narrow, 15-25 mm long.

Plants of our spring flora, inhabiting moist or wet woods.

A. Leaves compound, leaflets decurrent along the rachis, terminal leaflet much larger, obovate, roots fibrous. *C. pennsylvanica* Muhl. Bitter Cress

AA. Leaves simple, basal leaves orbicular with long petiole; cauline leaves ovate to lanceolate, commonly toothed; roots tuberous.

B. Flowers white, cauline leaves 5-10 in number.

C. bulbosa (Schreb.) BSP. Bitter Cress

BB. Flowers pink-purple, cauline leaves 3-5 in number.

C. douglasii (Torr.) Britt. Purple Bitter Cress

15. *Hesperis* L.

Biennial or perennial plants, 5–10 dm tall. Stems pubescent with simple and branched hairs. Leaves sessile or short petiolate, lanceolate or oblong, with simple hairs on upper surface, branched hairs beneath. Flowers commonly purple, varying to white. Fruit elongate, slender, with conspicuous swelling at apex of pedicel when fruits are young.

Plants escaped cultivation, inhabit moist meadows, river banks and moist open woods, introduced from Europe.

H. matronalis L. Dame's Rocket.

16. *Arabis* L.

Annual, biennial or perennial plants, 1–10 dm tall. Stems pubescent with simple or branched hairs, commonly at the base of the stem. Basal leaves entire to pinnately lobed; cauline leaves smaller, sessile. Flowers white in our species. Fruit elongate, many times longer than wide.

Plants of fields or open woods.

A. Pedicels widely spreading at maturity, fruits slightly to strongly decurved.

B. Basal leaves stellate pubescent on both surfaces.

A. divaricarpa A. Nels. Rock Cress

BB. Basal leaves glabrous or minutely pubescent with straight hairs.

C. Fruits 3–4 mm wide, slightly decurved at maturity, cauline leaves sessile, no sagittate base. *A. canadensis* L. Sickie Pod

CC. Fruits 1–2 mm wide, strongly decurved at maturity, cauline leaves sessile, with sagittate base. *A. laevigata* (Muhl.) Poir. Rock Cress

AA. Pedicels ascending or appressed at maturity.

D. Culine leaves sessile, linear to spatulate, plant 1–4 dm tall; seeds in one row in each valve of the fruit. *A. lyrata* L. Lyre-leaf Rock Cress

DD. Culine leaves commonly auriculate, lanceolate to narrowly oblong, plant 3–9 dm tall seeds in two rows in each valve of the fruit. . . *A. drummondii* Gray. Rock Cress

17. *Dentaria* L.

Perennial plants with rhizomes, 2–4 dm tall. Stem pubescent above with simple hairs. Leaves all similar, in whorls of three, palmately dissected, segments entire or toothed. Flowers white. Fruit elongate, tapering to a long beak.

Plants of our spring flora, inhabiting moist woods. *D. laciniata* Muhl. Toothwort.

18. *Alliaria* Scop.

Biennial or perennial herbs, 4–10 dm tall. Stem glabrous or sparsely pubescent with simple hairs. Culine leaves simple, deltoid, coarsely toothed. Flowers white. Fruit elongate, narrow, with conspicuous midnerve on each valve.

Plants introduced from Europe, inhabiting moist, shady places. Crushed leaves have the odor of garlic.

A. officinalis Andr. Garlic Mustard.

19. *Iodanthus* T. & G.

Perennial plants, 6–10 dm tall. Stem glabrous or pubescent with simple hairs. Leaves sessile, lanceolate or elliptic, basal ones commonly pinnatifid at the base of the blade. Flowers pale purple to white. Fruit linear, valve with inconspicuous midnerve.

Plants inhabit alluvial woods. Similar to *Hesperis*, but the plants are usually glabrous and possess only simple hairs when pubescent.

I. pinnatifidus (Michx.) Steud. Purple Rocket.

LITERATURE CITED

- Deam, C. C. 1940. Flora of Indiana. Dept. Conservation, Div. of Forestry, Indianapolis. 1236 pp.
- Fernald, M. L. 1950. Gray's Manual of Botany. 8th ed. American Book Company, New York. 1632 pp.
- Gleason, H. A. 1952. The New Britton and Brown Illustrated Flora of the Northeastern United States and Canada. 3 vols. New York Botanical Garden, New York. 1726 pp.
- Jones, G. N. 1950. Flora of Illinois. 2nd ed. Amer. Midl. Nat. Monograph No. 5. 368 pp.
- Moseley, E. L. 1928. Flora of the Oak Openings. Proc. Ohio Acad. Sci. 8: 82–134. Special paper No. 20.
- Schaffner, J. H. 1932. Revised catalog of Ohio vascular plants. Ohio Biol. Surv. Bull. 5: 89–215.

BOOK REVIEWS

General Geology Laboratory Workbook. Samuel P. Ellison, Jr., Editor. Harper & Brothers, Publishers, New York. 1958. x+285 pp. \$3.75.

This newest member of Harper's Geoscience Series is a paperbound workbook that is somewhat more complete and elaborate than most workbooks for general geology. The book consists of 34 exercises, which differ considerably in style and in time required for proper accomplishment. Twenty-two are concerned with topics in physical geology: minerals and rocks, topographic map construction and interpretation, and physiographic analysis. Six deal with the classification of animals and plants. One, in six parts, consists of block diagrams, in the flat and with only part of the geology shown, which the student must cut out, fold and paste into a solid figure, and complete by diagramming the geology on the blank faces. Five exercises are planned for work with various geologic maps supplied in the laboratory. In addition, there are six diagrammatic geologic maps that may be employed in various ways, and sheets on which field trip reports may be made. Supplementary to the historical exercises are homework outline sheets for each geologic period, on which the student may summarize the salient features of each period in North America. On the back of each is an outline Map on (*sic*) Outcrops and Paleogeography. These outlines and maps should be very helpful to the student of historical geology, by permitting him to organize a wealth of detail in a small space for learning and for review.

Most of the exercises are designed for use with whatever topographic and geologic maps or other materials the instructor may wish to use. Suggested lists of such items are included with each exercise. All the exercises are flexible in that regard, which makes it unlikely that files of completed exercises will be gathered by students and copied from year to year. The study questions and lists of appropriate references that accompany most of the exercises are generally excellent. Each topic covered by an exercise or exercises is introduced by a brief treatment of the subject, as a reinforcement of lectures and text assignments. All the pages are perforated for ready removal for submission to the instructor.

Although this workbook is a versatile and effective teaching aid, and perhaps the best such available, it does have some unfortunate aspects. Fluorescent light is considered synonymous with black light (p. 5). In the study of regional stream topography, no clear distinction is made between landforms in arid and in humid regions. The term paternoster lakes is little used by present-day glacial geologists. Ice sheets surely are normally characteristic of high latitudes rather than high altitudes (p. 125). The study of shorelines and shoreline processes is built around the outmoded and misleading classification into emerging, submerging, neutral, and compound shorelines (p. 151-159). Some of the modes of expression in the descriptive paragraphs are hardly good examples for impressionable college students: e.g., p. 201, "The student will find historical geology fascinating and easy to learn if he takes time to organize himself on these summary outlines." Notwithstanding objections of this sort, this imaginative workbook is a good one, is reasonably priced, and merits the serious consideration of anyone responsible for college courses in elementary geology.

MALCOLM P. WEISS

The Chemical Dynamics of Bone Mineral. William F. Neuman and Margaret W. Neuman. University of Chicago Press, Chicago. 1958. xi+209 pages. \$5.00.

This is, indeed, a most interesting and most provocative book in which the authors attempt to explain many things—occasionally on the basis of somewhat arbitrarily selected premises.

Chapter I, "Solution Chemistry," is a review of some of the principal theories on the behavior of electrolytic solutions. Chapter II, "Solubilities," discusses the application of some of these theories to bone. Here, at least one statement appears (p. 28) that will astonish most physical chemists: "One cannot approach the same *equilibrium* from the two different directions—precipitation and dissolution." (Italics added.) This is an admission, in effect, however, that the system is *not at equilibrium*, an admission that invalidates many of the authors' conclusions which pertain only to equilibrium conditions.

Chapter III, "The Mineral Phase," contains some statements which will astonish mineralogists, including: "It is difficult to attain a clear-cut comprehension of the crystallography of hydroxy apatite when mineralogists themselves do not agree on rather fundamental interpretations." While this reviewer admits that the situation has been somewhat befuddled by a few non-mineralogists, he was not aware of any significant difference of opinion among mineralogists concerning the fundamental crystallography of hydroxyapatite.

A decade or two ago, there was some confusion among mineralogists concerning carbonate apatites, which comprise the mineralogical analogs of tooth and bone substance. The authors, incidentally, do not mention francolite or dahllite, but use the pseudo-mineralogical term "pseudo-apatite" (quoting a non-mineralogist). Geologists will be surprised to learn (p. 42): "Geological

specimens [phosphorites] which are very old and probably formed at *high temperature* can be expected to have few internal defects." (Italics added.)

Other chapters are headed: Surface Chemistry, Skeletal Dynamics, Physiological Regulatory Mechanisms, and Mechanisms of Calcification. From the first chapter until the last, the argument is punctuated with a (Ca^{++}) $\cdot a$ (HPO_4^-) a very handy activity product, if it were possible to demonstrate a straight-forward relationship to the solid phase present, to the role of enzymes in ossification, to the cellular activity of the osteoblasts, or to several other physiological-chemical processes.

Despite the specific criticisms mentioned above and the authors' admission (p. vii), "By substitution of unconfirmed, preliminary findings and speculation for hard fact, the job was completed," this book represents a commendable effort by Dr. and Mrs. Neuman. The literary excellence of the authors' presentation may mislead persons who are not versed in some of the topics considered—particularly, mineralogy and physical chemistry—because the "hard fact" and "speculation" have been almost irretrievably intermixed.

DUNCAN MCCONNELL

The Atom and the Energy Revolution. *Norman Lansdell.* Philosophical Library, Inc. 200 pp. \$6.00.

This book considers only the peaceful uses of energy, including the atom among all possible sources of energy, and supplies facts needed for consideration of such questions as (1) the relation of industry to the state; (2) the effects on world trade; (3) the use of atomic energy to meet expanded needs when other sources of energy have gone to short supply; (4) the effects of atomic energy on the balance between food production and an expanding population.

To reach his desired audience, the business men, citizens and general readers, the author has presented his material in simplified, concise form. He has grouped his facts in nine sections the title of which are listed below as the best way of indicating the scope of the subject and manner of treatment.

- I World Energy Resources and Demand.
- II New Sources of Energy.
- III The Atom and its Energy.
- IV Methods of Releasing Atomic Energy.
- V Sources of Natural Materials for Atomic Energy Development.
- VI The Exploitation of Atomic Energy.
- VII Political and Commercial Organizations for Atomic Energy Development.
- VIII Radiation Risks and Insurance Against Them.
- IX The World Impact of Atomic Energy.

The format is good, and a brief glossary adds to the book's usefulness.

THOMAS H. LANGLOIS

Algae: The Grass of Many Waters. *Lewis Hanford Tiffany.* Charles C. Thomas, Pub., Springfield, Illinois. Second Ed. 1958. vii+199 pp., 13 figs., 41 pls.

During the intervening twenty years since the first edition of this book appeared, it has gained recognition as an outstanding contribution to algal literature. The second edition can only enhance this reputation. As the author remarks, "the world has moved along quite rapidly in twenty years," so likewise has the study of algae. Knowledge that did not exist at the time of the first edition has been incorporated by changes in the text and by the addition of a new chapter concerning "Algae and Research." Yet, in rewriting, the author has retained the simplicity and attractive style that appealed to the specialist and nonspecialist alike. In general the book summarizes the existing knowledge of the algae while emphasizing their relationships with people.

CLARENCE E. TAFT

Coastal and Submarine Morphology. *Andre Guilcher.* Translated from French by B. W. Sparks and Rev. R. H. W. Kneese. John Wiley & Sons, Inc. 274 pp. \$6.50.

This book, first published in French in 1954, now makes readily available to readers of English the comprehensive studies of a professor of Oceanography at the Sorbonne University. It is divided in two parts, dealing extensively in the first part with coastal geomorphology, and outlining in the second part the field of submarine geomorphology. Each of the five sections of PART I, dealing respectively with the forces in action, shoreline movements, coastal features related to sea action, a classification of coasts, and coastal evolution, is well documented and bears its own bibliography. Part II begins with some history, definitions and general references, and deals adequately with the continental margin and the deep-sea floor. The text is well written but legibility could have been increased by use of larger type. The 8 plates and 40 figures add greatly to the presentation.

THOMAS H. LANGLOIS